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**BODY:**

The state of science and technology in Maryland was the focus of some 250 people from industry, government, academia and civic organizations who gathered at the University of Maryland, College Park last month. Dividing into groups, they considered various aspects of Maryland's competitive status in an increasingly technological global economy. Here is a summary of some of their findings.

C.D. MOTE JR.

Maryland has jumped out ahead of the other states recently by developing a grass-roots response to technological challenges from countries such as India and China.

Over the past several months, new warnings have emphasized the growing threat to U.S. dominance in science and technology. President Bush and Congress have responded with proposals for federal action. But many of the issues require state and local responses as well, and Maryland is taking the lead in asking what we can do for ourselves.

We began with a summit. The University of Maryland and 19 other organizations convened top leaders from the public and private sectors to organize for an ongoing, grass-roots response.

It was the first statewide meeting of its kind since a National Academies' committee issued a report last year. The report warned that other nations are heavily investing in science and technology while U.S. commitments stagnate, and talent, investment and momentum move abroad. It recommended federal action steps, and Washington responded with proposals to increase investments in basic research, K-12 science and math education, higher education and incentives for industry.

We hope these efforts will bear fruit, but federal action is only part of the solution. Problems like K-12 education are ultimately state and local issues; states need to organize to get the right things done and better prepare to take advantage of new resources.

Below you'll find brief comments from summit moderators recapping what they heard in their workshops. You'll

see a substantial overlap, which, as one of the moderators suggests, points to systematic problems.

Maybe you'll have some ideas of your own and can make some commitments. If so, send them to me. We'll post them on the summit Web site. My e-mail address is: [president@umd.edu](mailto:president@umd.edu) C.D. Mote Jr. is president of the University of Maryland

RICHARD STEINKE

Panel: K-12 science and math education

Our panelists stressed the need to change perceptions of science-technology-engineering-mathematics (STEM). One survey found that 84 percent of U.S. middle school students would rather clean their rooms, take out the garbage or go to the dentist than do math homework.

Right from kindergarten, children need more opportunities to experience how science, technology and math are part of their everyday world. Yet, we heard again that the scale of solutions is too small for the scale of the challenges. While we have many excellent schools and teachers, we don't have enough.

It will take more to reach children who have never imagined a serious future in science, technology, engineering and mathematics -- a talent pool we cannot afford to ignore. Richard Steinke is deputy state superintendent with the Maryland State Department of Education.

STEVEN KNAPP

Panel: Higher education and recruiting/retaining best and brightest students, scientists and engineers

We discussed how to plug the leaky "pipeline" of talented students and teachers. Students are losing interest, and as a result the education pipeline leaks potential talent at every point. One way to address this problem is to focus on the entire spectrum, from "K through Gray." We can find an untapped resource in the retiring personnel from government and industrial labs around the state who might teach the STEM courses -- science-technology-education-math.

Marketing to students and parents is a priority -- responding to negative cultural signals that STEM fields are "boring," "nerdy," "too difficult" or lacking in opportunities. Also, we need to improve science teaching, making it more inspiring and connecting science and engineering to real-world experiences. Higher education can help by developing more-effective techniques for teaching in the lower grades. Communication with industry can help us identify the skills needed in today's world and tomorrow's. Steven Knapp is provost and senior vice president for academic affairs at the Johns Hopkins University.

WILLIAM JEFFREY

Panel: Commitment to long-term basic research

In basic research, Maryland starts from a position of strength because of the presence of federal government laboratories, as well as strong research universities and a highly trained work force. By many measures, Maryland ranks at the top of the nation in federal R&D investment on a relative scale. Private industrial R&D spending, however, is significantly below the federal support levels. Leveraging the presence of the federal government assets to benefit the future of the state's enterprises is a key goal.

One recommendation is to form a task force to identify Maryland's research strengths and needs and then to propose strategies to fill the gaps. We discussed the importance of top-notch university research facilities to help attract and accommodate more federal and private dollars. The goal is to be more facile at leveraging Maryland's research strengths. William Jeffrey is director of the National Institute of Standards and Technology.

**CHRISTOPHER C. FOSTER**

Panel: Innovation, entrepreneurship and tech transfer incentives

Work force is our No. 1 issue. For example, the lack of women in the STEM work force really hurts our competitiveness. And 80 percent of graduates who leave the state for their first job aren't coming back. We have to do a lot more to make sure they get jobs here.

On the incentive side, we need to change mind-sets that are stuck in the old economy. Basic tax credits, for example, don't work for young, innovative companies operating at a net loss for many years; they don't yet owe taxes. Instead of thinking about a government that's just business-friendly, we have to be innovation-friendly.

Christopher C. Foster is deputy secretary of the Maryland Department of Business and Economic Development.

**JAMES HARKINS**

Panel: Fostering emerging energy technologies

We must take a holistic approach, perhaps by forming a consortium on energy that involves government, the business sector and higher education. That three-legged stool can lead to a better working relationship. With a close partnership, we can develop an energy strategy for the state and make sure we're accessing all the available federal research dollars in this area. There's a lot of money out there for innovative programs. James Harkins is director of Maryland Environmental Service.

**GINO GEMIGNANI**

Panel: Job creation and workforce development

There's no apparent center of gravity for this movement in Maryland. The state needs a clear focal point with a broad enough depth of field that we can see short- and long-term.

One suggestion: Look to the untapped labor pool in Maryland. Approximately 900,000 people are not in the work force in a meaningful way. We tend to think of them as people with very severe problems, but some problems are more manageable, like language. We've got a number of scientists and engineers only separated from a wonderful job by a language barrier.

Also, business really needs to get more involved in education -- not sending a check, but getting into the classroom to inspire young people early on. We're not just preparing students to work in Maryland. We operate in a global economy, and students need to be trained in that mentality. Gino Gemignani is chairman of the Governor's Workforce Investment Board and senior vice president of Whiting-Turner Construction.

<A formal summary of the conference will be available on the University of Maryland Web site later this month at [www.competitive-edge.umd.edu](http://www.competitive-edge.umd.edu).

**GRAPHIC:** Photo(s)

1. "Maryland is taking the lead" in helping keep the state competitive, says University of Maryland President 2. C.D. Mote Jr. 3. Richard Steinke 4. Steven Knapp 5. William Jeffrey 6. James Harkins 7. Gino Gemignani

1. AMY DAVIS : SUN PHOTOGRAPHER

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